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Control of Garden Pests.
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CONTROL OF GARDEN PESTS

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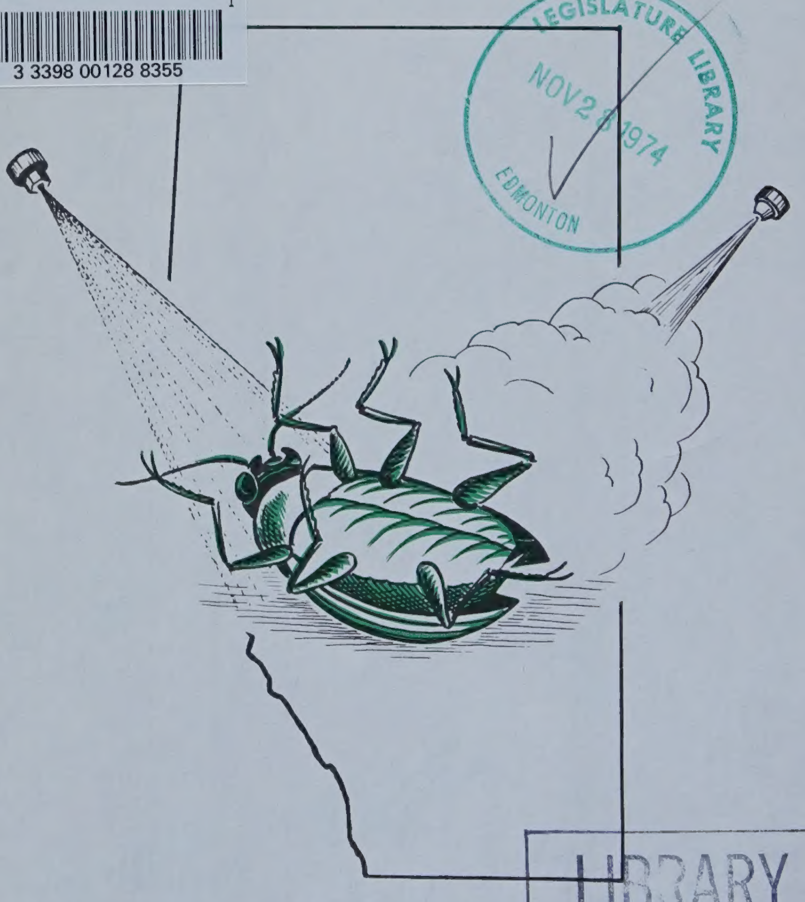

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First Aid Treatment:

1. Call a physician immediately or The Poison Control Centre listed in your local telephone directory. Provide the name of the insecticide and the antidote on the container.
2. If poison is swallowed, induce vomiting with warm salty water.
3. If spilled on clothing, remove, and wash skin thoroughly with soapy water.
4. Keep patient warm and quiet.

PRECAUTIONS

1. Always store pesticides under lock and key out of reach of children, pets and irresponsible people.
2. Take care that children cannot reach poisons that are being used.
3. Dispose of empty container safely. Burn or bury them.
4. Use the most recent insecticide recommendations and restrictions.
5. Follow label directions at all times.

INFORMATION SERVICE

Many insects are beneficial rather than harmful. Identify unknown insects before attempting control. Information on identification and control of insect pests may be obtained by taking or sending a sample of the insects to:

Your local District Agriculturist
University, Entomology Department
Federal Research Stations

OR

Crop Protection and Pest Control Branch,
Alberta Department of Agriculture,
EDMONTON, Alberta

Before Using Any
Pesticide
S T O P
Read the Label

PREPARED BY

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INTRODUCTION

The recommendations appearing in this pamphlet are approved by the Western Committee on Crop Pesticides. These recommendations are selected on the basis of their effectiveness, cost, availability and safety. Other insecticides may be used provided their labels carry registration for the intended use.

This publication supersedes all previous issues of Publication 625. This issue contains the most recent insecticide recommendations and restrictions known at the time of preparation. For detailed information consult your District Agriculturist or Regional Plant Industry Supervisor.

PREVENT INSECTICIDE RESIDUES

Insecticides are poisonous chemicals. Improper use of insecticides can cause residues to appear on crops grown for human or livestock food. Residues generally appear, when some individual has used the wrong insecticide, or too much of it, or at the wrong time, or for some other negligent reason.

Many insecticides, notably the chlorinated hydrocarbons (dieldrin, aldrin, endrin, heptachlor and DDT), are very persistent and may leave residues on crops or soils which could contaminate foodstuffs including meat and dairy products. This contamination may occur in many ways which are not immediately obvious. For example, root crops such as carrots and potatoes grown in soil treated with these compounds in previous years may pick up detectable residues, or contaminated fodder containing even traces of a chlorinated hydrocarbon, it may be stored and concentrated in the animal fat. This can give rise to chemically detectable residues in meat and milk. If these residues exceed the tolerances as established by the Food and Drug Directorate, then these products will not be allowed on the market.

For these reasons, the instructions on the labels of containers should be followed exactly to prevent insecticide residues from appearing in food products. The waiting period prescribed between treatment of crop and harvest or feeding to livestock should be carefully observed. Label recommendations dealing with the use of insecticides on soils, and subsequent crop rotations, should be carefully observed.

INSECTICIDE FORMULATIONS

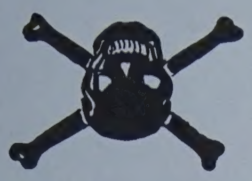
Insecticides are formulated as prepared mixtures ready to be used, or as concentrates, requiring dilution with water. Emulsifiable concentrates are the most suitable formulations to use in boom-type sprayers. Wettable powders tend to clog screens and nozzles, and require considerable agitation to prevent settling.

Prepared dusts, although easy to use and convenient, do not adhere well to foliage and should be applied when foliage is damp. Aerosoles containing prepared spray material are more expensive than other formulations and suited only for very special purposes. Granules are useful against soil insect pests.

APPLICATION

1. Follow label directions on the container for mixing and applying insecticides. Use the correct dosage for the pest involved. Lower than recommended rates may not be effective while heavier rates are wasteful and may damage the crop or cause an insecticide residue problem.
2. Always use the protective clothing or other safety equipment and application procedures as stated on label directions.
3. Most modern insecticides kill by stomach and contact action, therefore complete and uniform coverage with dusts or sprays makes them effective against both leaf-eating and sap-sucking pests.
4. Avoid application of insecticides in wet, hot or windy conditions. Adjacent plants and foliage may become contaminated with the chemical that is blown or washed from the treated plants.
5. Do not use insecticides in sprayers which have had 2,4-D in them. Small amounts of 2,4-D left in the sprayers can be very injurious to some garden plants. It is best to have two sprayers, one for herbicide and one for insecticide use.

HUMAN POISONING

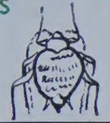
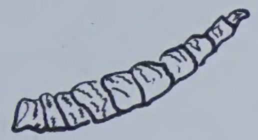
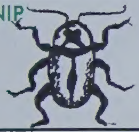
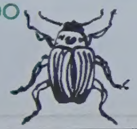
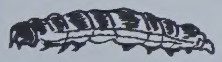
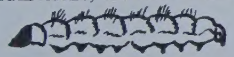
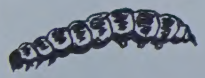
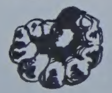
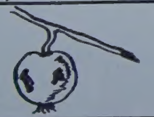
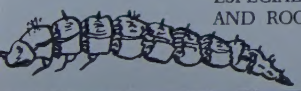


Insecticides may cause poisoning in humans if they are eaten or drunk, absorbed through the skin, or inhaled as dusts or vapours.

Symptoms:

Poisoning after exposure to these chemicals may show up as one or several of the following symptoms: hyperexcitability, instability, headache, pin-point pupils, blurred vision, tremors, convulsions and vomiting.

CONTROL of GARDEN PESTS

INSECT	HOST	INJURIOUS STAGES AND TYPE OF INJURY	SUMMARY OF LIFE HISTORY	CONTROL
APHIDS 	MOST GARDEN PLANTS	Aphids are very small, soft bodied insects which are often found in very large numbers on various plants. Adults may be winged or wingless, nymphs are wingless. Most species are light green in color but some are yellowish, brown, pink or black. Both adults and nymphs injure plants by sucking sap. Heavy infestations may cause plants to wither and die.	Most species of aphids on vegetables overwinter as eggs on the stem of some perennial plant. The eggs hatch in the spring and after one or two generations on the winter host, winged migrants fly to a summer host, an annual plant, such as those found in gardens. Except for the overwintering eggs, all young are produced as living young.	Use Endosulfan (Thiodan) 12 oz./acre or Malathion 10 oz./acre. Check label for the interval required between application and harvest as this varies for each crop.
ROOT MAGGOTS 	ONIONS TURNIPS (Rutabaga) CABBAGE OTHER CRUCIFERAE	White maggots varying from ¼" to ½" in length. The onion maggot lives in onion bulbs. Turnip maggots tunnel on the surface of the fleshy roots, making winding open scars and rough corky surfaces. The cabbage maggot may groove or tunnel the roots; new transplants may die, older plants wilt.	The onion cabbage and turnip maggot all winter in the pupal stage in the soil. The adult emerges in the spring and lays eggs on the soil beside growing onions. The eggs hatch and the maggots enter the bulbs. One maggot may move along a row of seedlings and destroy several. In larger onions several maggots may be found in one bulb. The maggots pupate in the soil producing a second generation of adults which in turn produces a second maggot generation. The second generation generally does not cause important damage. The turnip maggot adults emerge in July or August and females lay eggs on soil beside the roots. Maggots hatch and attack roots. One generation per year. The cabbage maggot adults emerge in early spring and lay eggs at the bases of newly set plants. Hatching occurs and development takes from 20 - 30 days. There are two to four generations annually depending on the locality.	Use Diazinon — Two applications as follows. *At seeding* — 2 pounds of 5% granular/1000 feet of row. Chemical should not be in contact with seed. Drench (late July to mid August) — ½ pint 50% emulsifiable concentrate per 40 gallons of water. Seven gallons per 1000 feet of row. Do not apply diazinon within 10 days of harvest.
RED TURNIP BEETLE 	TURNIPS, CABBAGE, CAULIFLOWER MUSTARDS, RADISHES OTHER CRUCIFERS	Foliage is eaten by both the larvae and adults. They are nocturnal in habit, and feed during the night. They are more common in fields where crucifers are grown continuously.	Little is known of their life history. They overwinter as eggs which are bright red and elliptical. The eggs hatch in the spring. The larvae are first orange with black spots and later become black when mature. Pupation occurs in the soil, the pupae being bright orange. The adult insect is a reddish beetle, marked with 3 black lines on the back and a broad middle stripe on the thorax.	Rotate crops to avoid cruciferous crops two years on same soil. Destroy cruciferous weeds, mustards, shepherds purse, etc. Dust edible vegetables with Rotenone.
FLEA BEETLES	POTATO, EGG PLANT TOMATO, CABBAGE CAULIFLOWER RADISH, TURNIP	Several species of flea beetles are injurious to vegetables. Adults are very small black beetles which jump very actively like fleas. Adults eat small circular holes about the size of a pin head in the leaves of their host, sometimes destroying much of the leaf surface. Small seedlings or transplants may die.	Most species are believed to overwinter in the adult stage under plant debris or in the top inch or two of soil. Adults emerge in the spring and lay eggs on the soil. The larvae feed on the rootlets and roots of the host plant, but cause little damage.	Use Diazinon 8 oz./acre as per label or Malathion 8 oz./acre. Do not apply Malathion within 7 days of harvest.
COLORADO POTATO BEETLE 	POTATOES TOMATOES EGG PLANT OCCASIONALLY OTHER PLANTS	Both adults and larvae eat the leaves of plants. Adults are round backed hard shelled, beetles with ten alternate black and yellow stripes on the wing covers. The larvae are soft, hump backed, brick-red, with two rows of black spots on each side. Potato plots could be almost completely destroyed if not controlled.	The winter is passed in the adult stage several inches below soil surface that emerge about the time potatoes begin to grow. Females lay orange colored eggs in clusters mostly on the underside of leaves. Eggs hatch and the larvae begin feeding. They complete development in about two weeks. They pupate in the soil and a new adult emerges which later re-enters the soil for hibernation.	Treat plants with Diazinon 10 oz./acre, Endosulfan 8 oz./acre or Guthion 6 oz./acre. Do not apply Guthion within 7 days, Diazinon within 10 days of harvest. Endosulfan may be applied up to date of harvest. Do not feed potatoes treated with Endosulfan to dairy cattle.
BEET WEBWORM 	MOST VEGETABLES	The larvae are yellowish, greenish or almost black in color up to ½" in length, with longitudinal black lines along the back and small white circles on either side. They feed on the leaves of host plants but if their numbers get too great they will move to new feeding areas.	Adults are small greyish-brown moths. Eggs are laid on the underside of leaves, and hatch in 7 - 10 days. Two generations per year but usually only one severe infestation of larvae. Overwintering as a larva in a cocoon.	Spray or dust edible foliage with Malathion, Carbaryl (Sevin) or Trichlorfon (Dylox). Check label for harvest restrictions.
IMPORTED CABBAGE WORM 	CABBAGE, CAULIFLOWER BRUSSEL SPROUTS, TURNIPS RADISHES, OTHER CRUCIFERS	Larvae eat holes in leaves of host plant, bore into heads, and dirty edible portions with their droppings. Larvae may be up to 1¼ inches in length slow moving caterpillars with a velvety green surface marked with a faint gold line down the back.	The adult is the well known white cabbage butterfly. They overwinter as a pupae and the adult emerges in the spring. Eggs are laid singly on the leaves; larvae hatch from the eggs and begin feeding. There may be two or three generations per season.	Apply Carbaryl (Sevin), Endosulfan (Thiodan), Malathion or Rotenone to affected plants as per label directions.
CUTWORMS  	ALL GARDEN CROPS	Most cutworm larvae destroy seedlings or transplants by cutting them off at or just below the soil surface, thus the plants fall over and die. A few species climb plants and eat the foliage. Most cutworms feed at night.	Adults are the well known "millers" or cutworm moths which are attracted to lights in midsummer. Common species overwinter as eggs in soil that hatch in the early spring. Cutworms feed until late in June and then pupate in the soil. Adults emerge in July or August and lay eggs before autumn. A few species overwinter as larvae or pupae. One generation per year.	Use prepared cutworm dusts as per label. Do not apply to edible portions. Protect cabbage etc., with cans or tar paper collars, sunk 3 inches into the soil.
GRASSHOPPERS	ALL GARDEN CROPS	Both adults and nymphs eat the leaves, and in years when grasshoppers are abundant, entire gardens may be destroyed.	All our damaging (economic) species overwinter in the egg stage. Eggs hatch in the early spring and young hoppers may invade gardens. The adults may move in during the summer.	Control while hoppers are small by spraying non-edible foliage around garden with Sevin, Dimethoate or Malathion. Edible foliage may be sprayed with Carbaryl (Sevin) or Malathion.
CURRANT FRUIT FLY (MAGGOT) 	CURRANT GOOSEBERRY	Eggs are deposited as soon as the petals fall and hatch into small white maggots which live inside the developing berries. They may cause discolored blotches on the sides of the berries; many of the berries ripen prematurely and fall to the ground.	These insects overwinter as pupae in the soil under currant and gooseberry bushes. The puparium looks very similar to a plump kernel of wheat. Adult flies are small and pale yellow, with dark markings on their wings and occur just before blossom time. The females deposit eggs in the newly formed berries.	Spray entire bush with Methoxychlor when 80% of blossoms have fallen, repeat in 10 days. This is for control of flies before they lay their eggs. Control is not effective after berries form. Check label for waiting period to harvest of berries.
WIREWORMS 	GARDEN CROPS ESPECIALLY POTATOES AND ROOT CROPS	Larvae only are injurious. They are reddish brown or yellowish brown, up to 1 inch in length, somewhat cylindrical and distinctly segmented. Seeds and under ground parts of seedlings damaged in spring by boring. Seeds attacked may not sprout, seedlings wilt. Potatoes and root crops tunnelled.	Adults are the familiar click beetles. Females deposit eggs in the soil; larvae hatch and begin feeding. Three to seven years required by most destructive species to complete life cycle.	Chlordane as per label. Dyfonate 10G apply before planting as directed on label.
SLUGS	MOST GARDEN CROPS	Adult slugs are greyish brown, soft bodied, slimy creatures up to 2 inches in length. As they move they leave a glistening trail from a body secretion. Slugs feed at night on plant foliage or fruits. Ripe tomatoes are most severely damaged locally. Small backyard gardens are much more severely infected than are commercial plantings, since they are often damp with little direct sun and contain debris under which slugs can hide by day.	Life history is not known but it is believed that the adults overwinter. Eggs are laid in soil under boards and other debris. The young resemble the adults, except in size. Damp locations and high humidity favor increase and survival.	In gardens get rid of plant rubbish, boxes, sacks and other materials where slugs can hide and lay eggs. Trim rank grass and weeds along fence rows and ditches. Use prepared slug bait containing Metaldehyde. Insure that the baits are prepared from fresh stock as baits stored for long periods lose their effectiveness.